

S/N Unknown

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kie Y. Ahn et al.	Examiner:	Unknown
Serial No.:	Unknown	Group Art Unit:	Unknown
Filed:	Herewith	Docket:	1303.033US2
Title:	LOW-TEMPERATURE GROWN HIGH-QUALITY ULTRA-THIN PRASEODYMIUM GATE DIELECTRICS		

INFORMATION DISCLOSURE STATEMENT

MS Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the enclosed materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicants respectfully request that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicants with the next official communication.

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement.

Pursuant to 37 C.F.R. §1.98(d), copies of the listed documents are not provided as these references were previously cited by or submitted to the U.S. Patent Office in connection with Applicants' prior U.S. application, Serial No. 10/027315, filed on December 20, 2001, which is relied upon for an earlier filing date under 35 U.S.C. §120.

The Examiner is invited to contact the Applicants' Representative at the below-listed telephone number if there are any questions regarding this communication.

Respectfully submitted,

KIE Y. AHN ET AL.

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

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Application Number	Unknown
Filing Date	Even Date Herewith
First Named Inventor	Ahn, Kie
Group Art Unit	Unknown
Examiner Name	Unknown

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US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document	Class	Subclass	Filing Date If Appropriate
	US02/0089,023	07/11/2002	Yu, Zhiyi , et al.	257	411	01/05/2001
	US2002/0155688	10/24/2002	Ahn, Kie Y., et al.	438	592	04/20/2001
	US2002/0155689	10/24/2002	Ahn, Kie Y., et al.	29	76	02/11/2002
	US2003/0017717	01/23/2003	Ahn, Kie , et al.	438	768	07/18/2001
	US20030175411 A1	09/18/2003	Kodas, T. T., et al.	427	58	10/04/2002
	US-4,215,156	07/29/1980	Dalal, Hormazdyar M., et al.	427	84	08/26/1977
	US-4,333,808	06/08/1982	Bhattacharyya, Arup , et al.	204	192 D	02/13/1981
	US-4,399,424	04/16/1983	Rigby, Leslie J.	338	34	10/05/1981
	US-4,647,947	03/03/1987	Takeoka, Yoshikatsu , et al.	346	135.1	09/13/1985
	US-4,767,641	08/30/1988	Kieser, Jorg , et al.	427	38	07/03/1986
	US-4,920,071	04/24/1990	Thomas, Michael	437	188	08/18/1987
	US-5,698,022	12/16/1997	Glassman, Timothy E., et al.			08/14/1996
	US-5,795,808	08/18/1998	Park, Bo	438	301	11/12/1996
	US-5,801,105	09/01/1998	Yano, Yoshihiko , et al.	438	785	06/14/1996
	US-5,810,923	09/22/1998	Yano, Yoshihiko , et al.	117	84	05/10/1996
	US-5,822,256	10/13/1998	Bauer, Mark , et al.	365	200	03/05/1997
	US-5,828,080	10/27/1998	Yano, Yoshihiko , et al.	257	43	04/17/1995
	US-5,840,897	11/24/1998	Kirlin, Peter , et al.	546	2	06/07/1995
	US-6,013,553	01/11/2000	Wallace, Robert , et al.	438	287	07/15/1998
	US-6,020,024	02/01/2000	Maiti, Bikas , et al.	427	248.1	08/04/1997
	US-6,027,961	02/22/2000	Maiti, Bikas , et al.	438	199	06/30/1998
	US-6,171,900	01/09/2001	Sun, Shi-Chung	438	240	04/15/1999
	US-6,211,035	04/03/2001	Moise, Theodore , et al.	438	396	09/09/1999
	US-6,225,168	05/01/2001	Gardner, Mark , et al.	438	287	06/04/1998
	US-6,297,539	10/02/2001	Ma, Yanjun , et al.	257	410	07/06/2000
	US-6,303,481	10/16/2001	Park, Dong	438	591	12/29/2000
	US-6,368,941	04/09/2002	Chen, Tai-Ju , et al.	438	424	11/08/2000
	US-6,387,712	05/14/2002	Yano, Yoshihiko , et al.	438	3	12/03/1999
	US-6,391,769	05/21/2002	Lee, Jong-myeong , et al.	438	643	03/14/2000

EXAMINER**DATE CONSIDERED**

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Group Art Unit	Unknown
Examiner Name	Unknown

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	US-6,448,192	09/10/2002	Kaushik, Vidya S.	438	785	04/16/2001
	US-6,458,701	10/01/2002	Chae, Yun-sook , et al.	438	680	10/12/2000
	US-6,465,334	10/15/2002	Buynoski, Matthew S., et al.	438	591	10/05/2000
	US-6,495,436	12/17/2002	Ahn, Kie , et al.	438	591	02/09/2001
	US-6,514,828	02/04/2003	Ahn, Kie Y., et al.	438	297	04/20/2001
	US-6,521,911	02/18/2003	Parsons, Gregory N., et al.	257	52	07/19/2001
	US-6,534,420	03/18/2003	Ahn, Kie Y., et al.	438	768	07/18/2001

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Foreign Document No	Publication Date	Name of Patentee or Applicant of cited Document	Class	Subclass	T ²
	JP-2001-332546	11/30/2001		H01L	21/316	

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		BRIGHT, A A., et al., "Low-rate plasma oxidation of Si in a dilute oxygen/helium plasma for low-temperature gate quality Si/SiO ₂ interfaces", <u>Applied Physics Letters</u> , 58(6), (February 1991),619-621	
		BUNSHAH, ROINTAN F., et al., "Deposition Technologies for Films and Coatings: Developments and Applications", <u>Park Ridge, N.J., U.S.A. : Noyes Publications</u> , (1982),102-103	
		CHENG, BAOHONG , et al., "The Impact of High-k Gate Dielectrics and Metal Gate Electrodes on Sub-100nm MOSFET's", <u>IEEE Transactions on Electron Devices</u> , 46(7), (July 1999),1537-1544	
		FUYUKI, TAKASHI , et al., "Initial stage of ultra-thin SiO ₂ /sub 2/ formation at low temperatures using activated oxygen", <u>Applied Surface Science</u> , 117-118, (June 1997),123-126	
		GELLER, S. , et al., "Crystallographic Studies of Perovskite-like Compounds. II. Rare Earth Aluminates", <u>Acta Cryst. Vol. 9</u> , (May 1956),1019-1025	
		GIESS, E. A., et al., "Lanthanide gallate perovskite-type substrates for epitaxial, high-T/sub c/ superconducting Ba/sub 2/YCu/sub 3/O/sub 7- delta / films", <u>IBM Journal of Research and Development</u> , 34(6), (November 1990),916-926	
		HIRAYAMA, MASAKI , et al., "Low-Temperature Growth of High-Integrity Silicon Oxide Films by Oxygen Radical Generated in High Density Krypton Plasma", <u>International Electron Devices Meeting 1999. Technical Digest</u> , (1999),249-252	
		HUBBARD, K. J., et al., "Thermodynamic stability of binary oxides in contact with silicon", <u>Journal of Materials Research</u> , 11(11), (November 1996),2757-2776	
		JEON, SANGHUN , et al., "Excellent electrical characteristics of lanthanide (Pr, Nd, Sm, Gd, and Dy) oxide and lanthanide-doped oxide for MOS gate dielectric applications", <u>Electron Devices Meeting, 2001. IEDM Technical Digest</u> .	

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OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

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		International, (2001),471-474	
		LIU, C. T., "Circuit Requirement and Integration Challenges of Thin Gate Dielectrics for Ultra Small MOSFETs", <u>International Electron Devices Meeting 1998. Technical Digest</u> , (1998),747-750	
		LIU, Y C., et al., "Growth of ultrathin SiO ₂ / on Si by surface irradiation with an O ₂ /Ar electron cyclotron resonance microwave plasma at low temperatures", <u>Journal of Applied Physics</u> , 85(3), (February 1999),1911-1915	
		MARTIN, P J., et al., "Ion-beam-assisted deposition of thin films", <u>Applied Optics</u> , 22(1), (January 1983),178-184	
		MULLER, D. A., "The Electronic Structure at the Atomic Scale of Ultrathin Gate Oxides", <u>Nature</u> , 399, (June 1999),758-761	
		OHRING, MILTON , "The Materials Science of Thin Films", <u>Boston : Academic Press</u> , (1992),118,121,125	
		OSTEN, H. J., et al., "High-k gate dielectrics with ultra-low leakage current based on praseodymium oxide", <u>International Electron Devices Meeting 2000. Technical Digest. IEDM</u> , (2000),653-656	
		PARK, BYUNG-EUN , et al., "Electrical properties of LaAlO ₃ /Si and Sr _{0.8} Bi _{2.2} Ta ₂ O ₉ /LaAlO ₃ /Si structures", <u>Applied Physics Letters</u> , 79(6), (August 2001),806-808	
		QI, WEN-JIE , et al., "MOSCAP and MOSFET characteristics using ZrO ₂ gate dielectric deposited directly on Si", <u>Electron Devices Meeting, 1999. IEDM Technical Digest. International</u> , (1999),145-148	
		SAITO, YUJI , et al., "Advantage of Radical Oxidation for Improving Reliability of Ultra-Thin Gate Oxide", <u>2000 Symposium on VLSI Technology Digest of Technical Papers</u> , (2000),176-177	
		SAITO, YUJI , et al., "High-Integrity Silicon Oxide Grown at Low-Temperature by Atomic Oxygen Generated in High-Density Krypton Plasma", <u>Extended Abstracts of the 1999 International Conference on Solid State Devices and Materials</u> , (1999),152-153	
		WILK, G. D., et al., "High-K gate dielectrics: Current status and materials properties considerations", <u>Journal of Applied Physics</u> , 89(10), (May 2001),5243-5275	

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